

SCIENCE

NEW YORK, APRIL 17, 1891.

EUROPE DURING AND AFTER THE ICE AGE.

TEN lectures under this title have been given by Professor James Geikie of the University of Edinburgh, beginning March 13 and ending April 10, as one of the courses of the Lowell Institute, Boston.

Beginning with descriptions of the physiography of Europe and of the present glaciers of the Alps, Professor Geikie afterward described successively the glacial deposits of the Alps and adjacent lower lands, of the British Isles, and of the Scandinavian Peninsula, northern Germany, Finland, and north-western and northern Russia. The accompanying map of Europe at the climax of the glacial period delineated the maximum area of the European ice-sheet nearly as it is mapped in this author's "Prehistoric Europe," but represented it as extending farther north-east, so as to cover the northern part of the Ural Mountains. A very perfect demonstration of the origin of the till or boulder-clay by the agency of land-ice is supplied by this order of presentation, first considering the development of the till, moraines, and glacial striæ, in the valleys and lowlands bordering the Alps, where glaciers still exist, being evidently the shrunken representatives of their formerly much greater extent during the glacial period or ice age. No theorist has ever claimed a marine origin for these glacial deposits. Thence Professor Geikie proceeds to the similar Scottish till, which in all its characteristics and in its distribution, scanty in the valleys of the mountains and highland districts, but spread thickly on the lowlands, is manifestly the exact analogue of the Swiss ground-moraine. Both, therefore, are attributable to land-ice. And the same argument includes likewise the similar but far more extensive deposits of till and fluvio-glacial detritus which thickly cover the low tracts of Sweden, Denmark, northern Germany, and a large part of Russia. During the final melting of the ice-sheets, much of the finest detritus which had been incorporated with their lower portion was borne far away by rivers, and deposited as loess in the valleys and on flat lands, or in some places in broad shallow lakes.

One interglacial epoch, and perhaps more than one, interrupted the severe cold of the ice age in Europe. For a long time, between two epochs of glaciation and accumulation of till, a mild interglacial climate permitted southern animals and plants to extend into Great Britain and northern Germany; and during this time the ice-sheets were doubtless wholly melted away, or were as much restricted as now, remnants of them lingering only in the Alps and on the mountainous plateau of Scandinavia.

After this mild and even warm interval, which was of long duration, the glaciers of the Alps again spread out to the lowlands, but not so far as before; and ice-sheets were again accumulated upon the British Isles, Scandinavia, Finland, and northern Germany; but they too were less extensive than in the earlier glacial epoch. The British ice-sheet during that earlier epoch had extended south to the Thames;

but the ice of the later epoch, according to Professor Geikie, though again wholly enveloping Scotland, reached into England only to Lincolnshire. The earlier British ice-sheet certainly, and the later one probably, were confluent with the ice which deployed from Scandinavia southward in a broad *mer de glace* over the area of the North Sea, bringing Norwegian boulders to the shores of England. All of Scandinavia, excepting a small tract of southern Sweden, appears to have been covered by the ice-sheet of the latest glacial epoch, which also, as mapped by Professor Geikie, reached east over Lapland to the White Sea, and over Finland nearly to Lakes Onega and Ladoga, but did not cover the Gulfs of Finland and Riga. Toward the south and west, however, the "great Baltic glacier," a lobe of this latest ice-sheet of north-western Europe, filled the basin of the Baltic Sea and overflowed the low northern margin of Germany to Berlin, and the eastern half of Denmark. The extreme limits of the earliest European ice-sheet are not generally marked by terminal morainic accumulations, but rather by extensive stratified deposits of gravel and sand. On the other hand, the later glaciation is bounded in many places by prominent hilly and knolly terminal moraines, with abundant erratic blocks.

Since the ice age, there is evidence, in the fossil faunas and floras of marine deposits and peat bogs, that north-western Europe has experienced for some time a climate considerably warmer than that of the present day; and the speaker compared this with the formerly warmer waters of the Atlantic on the shores of New England and the eastern provinces of Canada, which allowed various species of southern mollusks in the post-glacial or recent epoch to extend northward to the Gulf of St. Lawrence, though now they have become mainly extinct north of Cape Cod, excepting a few colonies that survive in favorable localities. These climatic changes following the glacial period unite the whole quaternary era as characterized from its beginning to the present day by numerous alternations from severity to mildness of climate, and the reverse.

Inquiring what were the causes of the ice age, Professor Geikie pointed out its complex character, with two or more epochs of severe climate and ice accumulation, divided by recession of the ice and long-continued mild conditions; and he especially called attention to the Alpine glaciation and the ice-sheets of north-western Europe as simply the increased and greatly extended development of the glaciers that still are found in Switzerland and Scandinavia. A lowering of the mean temperature of Europe by twelve degrees might gradually restore the ice-sheets. The short estimates of the time (7,000 to 10,000 years) that has passed since the latest glaciation of the northern United States, given by N. H. Winchell, Andrews, Gilbert, and Wright, from their consideration of the recession of waterfalls and erosion of river-gorges, as stated in Wright's "Ice Age in North America," are pronounced by Professor Geikie unreliable; and he maintains the astronomical theory of his friend and colleague, the late Dr. James Croll, which accounts for glacial epochs by eccentricity of the earth's orbit, placing the close of the latest glaciation

about 80,000 years ago. But Professor Geikie shows that man, using paleolithic or rough stone implements, was living in France and southern England during this last glacial epoch. When the latest ice departed, permitting men to extend north over Scotland and north-western Europe, they had already reached their neolithic stage, using smoothly ground and polished stone implements.

The alternative theory of the cause of the accumulation of ice-sheets, which is held by Dana, Upham, and LeConte, ascribing the cold climate to elevation of the glaciated areas as high plateaus, so that they would receive snowfall during the greater part of the year, seems to Professor Geikie very improbable, and a large portion of his last lecture was devoted to its refutation. This explanation, however, would accord with the estimates of the length of post-glacial time before noticed, and would seem more consistent with the probable antiquity of man, and with his known rate of development of skill in the manufacture of implements and in all the useful arts.

TREATMENT OF FUNGOUS DISEASES.¹

THAT many of the most destructive diseases of cultivated plants can be and are every year almost completely controlled, is a fact perfectly well known to those who are familiar with the subject; but it has as yet come to be realized by very few, relatively, of those to whom it is of the greatest importance,—farmers, gardeners, fruit-growers, florists, amateurs, and others.

The practicability and great money value of proper treatment in the case of various plant-diseases, which, in the absence of such treatment, would reduce the yield of important crops to almost nothing, have already become apparent to some cultivators who have been progressive enough to try for themselves, or who live near the experimental fields or orchards of experiment stations, or of progressive neighbors. The vast majority, however, of those who should be most interested have been heretofore too indifferent or too sceptical even to investigate the basis of the very strong and positive statements which have been made concerning the efficacy of preventive treatment for fungous diseases of plants.

From the nature of parasitic fungi, and the fact that they are for the most part parasites within the tissues of their hosts, it is evident that our efforts must be directed toward preventing their attacks. The present state of our knowledge does not enable us to stop the development of a parasite within its host-plant, without injury to the host, after it has once obtained a foothold.

The various forms of preventive treatment for a given disease fall naturally under two heads,—field and orchard hygiene, and individual protection. The former includes the minimizing of all sources of infection by the removal of rubbish, of remains of diseased plants or fruits, or of wild plants which may serve as propagators of the disease. The latter includes the application to the plants to be protected of substances in liquid or solid form which shall fortify them against the attacks of fungi which cause disease. Such substances are known as "fungicides." Since different fungi attack their hosts in very different ways, since their modes of development and the effects which they produce differ widely, it is plain that no all-embracing rule can be laid down for the treatment of fungous diseases. Certain principles of general applicability can, however, be stated, certain general directions can be given, and instructions regarding the preparation and application of those fungicides which have been proved to be most useful and effective can be furnished.

There are definite laws of health for plants as well as for animals; and in one case, as in the other, neglect of those laws invites disease. In the first place, plants which are expected to grow and thrive must be furnished with an abundance of the materials necessary to growth. Weak, poorly nourished plants suffer the attacks of parasites of all sorts, and have no power to resist them. Second, where a crop has suffered from a fungous disease in one

season, and a good crop of the same kind is desired in the following season, every tangible trace of the disease must be removed. For example: if a vineyard has suffered from mildew or black rot, all diseased leaves and berries should be collected at the end of the season with scrupulous care, and wholly burned; and the same advice applies to a large list of cases. Thus incalculable numbers of the spores of the fungi of the respective diseases will be prevented from infesting the next season's crop. In some cases where the spores remain in the soil, as in the stump-foot of cabbages or the smut of onions, the attacks of the disease can only be avoided by rotation with crops upon which the fungus in question cannot live. Third, wild plants, which, being nearly related to a given cultivated one, may be subject to the same disease, or which bear a complementary spore-form of a pleomorphic fungus, should be carefully excluded from the neighborhood of cultivated ones. Thus, wild cherries or plums, which are equally subject to the black-knot, should be kept away from plum-orchards, and spinach-fields should be kept free of pig-weed, since both plants are attacked by the same mildew; and again, since red cedars bear one spore form of a fungus whose other form is the rust of apple-leaves, it is plain that they should not be allowed to grow near an apple-orchard.

Now, when the general hygienic conditions have been made as unfavorable as possible to the development of disease, we may resort finally to the special protection afforded by the use of fungicides.

These preparations, when properly prepared and when applied at the right times and in the right way, have been abundantly proved to be of the greatest value, and often to determine the difference between a full crop from plants on which they are used and practically no crop where they are not applied.

But the fact cannot be too strongly emphasized that every thing depends upon how they are prepared, and upon how and when they are applied. The bulletin gives somewhat full instruction how to prepare and apply the most valuable fungicides, and such general hints when to apply them as will be of service. The proper times for their application vary so much with special conditions, however, that instructions on this point must form an important part of the special directions for any particular case.

The protective quality of most of the best fungicides lies in the fact that they contain a certain proportion of copper; and, of the four recommended as applicable to most cases of fungous diseases, three contain it as the essential constituent.

The Bordeaux mixture requires six pounds of sulphate of copper, four pounds of quicklime (fresh), and twenty-two gallons of water.

The sulphate of copper, known to the trade also as blue vitriol or blue-stone, is dissolved in two gallons of water. The solution will be hastened if the water be heated and the sulphate pulverized. After the solution is complete, fourteen gallons of water are added to it. The quicklime is slaked in six gallons of water, and stirred thoroughly until it forms a smooth, even mixture. After standing for a short time, it is again stirred, and added gradually to the sulphate solution, which is thoroughly stirred meanwhile. The mixture is then ready for use, though some experimenters recommend further dilution to twenty-five or thirty gallons for certain uses. It should not be prepared until needed, and should be used fresh, as it deteriorates with keeping. Since the lime remains merely in suspension, and is not dissolved, the mixture should be strained through fine gauze before entering the tank of the spraying-machine, so that all of the larger particles which might clog the sprayer may be removed.

Ammoniacal carbonate of copper, in its improved form, is prepared from three ounces of carbonate of copper, one pound of carbonate of ammonia, and fifty gallons of water.

Mix the carbonate of copper with the carbonate of ammonia, pulverized, and dissolve the mixture in two quarts of hot water. When they are wholly dissolved, add the solution to enough water to make the whole quantity fifty gallons. This preparation has been found to be better and cheaper than that made according to the original formula, which is as follows:—

Dissolve three ounces carbonate of copper in one quart *aqua*

¹ Abstract of Bulletin No. 39 of the Massachusetts State Agricultural Experiment Station, for April, 1891, by James Ellis Humphrey.

ammonia (22° B.), and add the solution to twenty-five gallons of water.

Dr. Thaxter of the Connecticut Experiment Station suggests that a very large saving may be made by preparing the carbonate of copper by the following method, instead of buying it, as its market price is much greater than that of the materials necessary for its preparation. Take two pounds of sulphate of copper and dissolve it in a large quantity of hot water; in another barrel or tub dissolve two and one-half pounds of carbonate of soda (sal soda) in hot water. When both are dissolved and cooled, pour the soda solution into the copper solution, stirring rapidly. There will result a blue-green precipitate of carbonate of copper, which must be allowed to settle to the bottom of the vessel. Now draw off the clear liquid above the sediment, fill the vessel with fresh water, and stir up the contents thoroughly. After the copper carbonate has once more settled to the bottom, again draw off the clear fluid above. The carbonate may now be removed from the vessel and dried, when it is ready for use. From the amount of blue-stone and sal soda given above will be produced one pound of copper carbonate, and the amount of each necessary to produce any given amount of copper carbonate is easily calculated.

Sulphate of copper is used in solutions of varying strength for certain special cases.

Sulphide of potassium, known also as sulphuret of potassium or liver of sulphur, has been found useful in the treatment of diseases caused by those fungi known as "powdery mildews," especially on plants grown under glass. It is ordinarily used in the proportion of half an ounce of the sulphide to one gallon of water.

The one of the above fungicides chosen as most available under existing conditions is now to be applied to the plants which it is desired to protect against disease. In the special case of the grain smuts, the only effectual treatment is that applied to the seed-grain, since these fungi depend for their propagation upon the spores which adhere to the grain and germinate with it. They cannot attack the host-plant after it has fairly passed the seedling stage, and the adhering spores may be killed before planting without injury to the seed. But ordinarily the fungicide must be thoroughly applied to the whole of each growing plant in the form of a fine spray, so that the plant is completely wet, but not flooded. Perhaps a practical measure of the proper amount of a fungicide to be applied to a plant may be obtained by stopping as soon as the plant is wholly wet, and before the solution begins to drip from it. In order to insure a fine and even spray and economy of materials, especial care should be used in securing proper nozzles. The ordinary spraying-nozzles used with hose or with small hand-pumps are utterly unsuited to this purpose.

As has been said, the question when to apply is of the first importance in dealing with any disease, but the answer varies with the case in hand. In general, however, let it be remembered that all treatment is preventive, that plants once attacked are lost, and that spraying must therefore be prompt and early. In the case of a disease of an herbaceous crop like potatoes, the first spraying should be given at once on the appearance of the disease in any part of the field or in a neighboring field. The same applies to diseases of woody plants, which have previously been free from disease; but where grapes or apples, for instance, were attacked last year, treatment should begin with the beginning of growth, and should proceed on the assumption that the disease will reappear if not prevented. In any case, after spraying is begun, it must be repeated until danger is past (a very variable period) at intervals which may average ten days or two weeks, but will vary according to circumstances, depending especially on the amount of rainfall, which washes the copper salts from the plants, and renders a new application necessary. It is always best to leave an occasional plant or row of plants untreated among the treated ones, to furnish a basis for judgment as to the efficacy of the treatment.

It is earnestly hoped that many persons in the State who have suffered in the past from fungous diseases will this year undertake definite measures to avoid such losses, and will communicate early their intention to do so to the station.

SCHOOL OF APPLIED ETHICS, SUMMER SESSION.¹

BEGINNING early in July, and continuing six weeks, there will be held at some convenient summer resort in New England or New York a school for the discussion of ethics and other subjects of a kindred nature. The matter to be presented has been selected with regard to the wants of clergymen, teachers, journalists, philanthropists, and others who are now seeking careful information upon the great themes of ethical sociology. It is believed that many collegiate and general students will also be attracted by the programme. Speakers and subjects will be, so far as arranged, as follows:—

I. Department of Economics, in charge of Professor H. C. Adams, Ph.D., of the University of Michigan.

Professor Adams will deliver eighteen lectures (three during each of the six weeks) on the history of industrial society in England and America, beginning with the middle ages, and tracing genetically the gradual rise of those conditions in the labor world which cause so much anxiety and discussion to-day.

Along with this main course will be presented (1) three lectures by President E. Benjamin Andrews, — one on the evils of our present industrial system, one on socialism as a remedy, and one on the better way; (2) three lectures by Professor Frank W. Taussig, Ph.D., — one on distributive and credit co-operation, one on productive co-operation and profit-sharing, and one on workmen's insurance; (3) three lectures by Hon. Carroll D. Wright on factory legislation; (4) three lectures by Professor J. B. Clark, Ph.D., on agrarian questions, discussing rent and tenure, and considering the agrarian element in the farmers' alliance movement; (5) three lectures by Albert Shaw, Ph.D., — one on the housing of the poor in Paris, one on the housing of the poor in London, and one on Gen. Booth's scheme for relieving poverty (the first two of these lectures will have especial reference to the question of rapid-transit facilities in cities); (6) three lectures by Professor E. J. James, Ph.D., on labor and industrial legislation in Europe.

In addition to the above, two lectures are expected from Mr. Henry D. Lloyd of Chicago, giving chapters in the industrial history of the United States.

If there be sufficient demand for it, special instruction in the principles of economics will be provided.

II. Department of the History of Religions, in charge of Professor C. H. Toy, D.D., of Harvard University.

Professor Toy will offer a general course of eighteen lectures, extending through the six weeks, treating the history, aims, and method of the science of history of religions, and illustrating its principles by studies in the laws of religious progress, with examples drawn from the chief ancient religions. Among the topics will be the classification of religions, conceptions of the Deity, religion and superstition, sacrifice and the priesthood, the idea of sin, religion and philosophy, religion and ethics, sacred books, religious reformers and founders.

The provisional scheme for the special courses is as follows: "Buddhism," Professor M. Bloomfield, Johns Hopkins University; "The Babylonian-Assyrian Religion," Professor M. Jastrow, University of Pennsylvania; "Mazdeism," not yet provided for; "Islam," Professor G. F. Moore, Andover Theological Seminary; "The Greek Religion," not yet provided for; "The Old Norse Religion," Professor G. L. Kittredge, Harvard University.

It is hoped also to arrange a set of Sunday-evening lectures, in which the positions of various religious bodies, Catholic, Protestant, and Jewish, will be expounded by prominent members of these bodies.

III. Department of Ethics, in charge of Professor Felix Adler, Ph.D., of New York.

Professor Adler will offer a general course of eighteen lectures, extending through the six weeks, on the system of applied ethics, including a brief survey of the various schemes of classification adopted in ancient and modern ethical systems, the discussion of the relation of religious to moral instruction, of the development of the conscience in the child, etc. The scheme of duties treated will embrace personal ethics, social ethics in general, the ethics of

¹ From April number, *International Journal of Ethics*.

the family, the ethics of the professions, the ethics of politics, the ethics of friendship, the ethics of religious association. The scheme of duties will be treated with special reference to the moral instruction of children.

The provisional programme for the special courses in this department is as follows: "Introduction to an Ethical Theory," three lectures by W. M. Salter; "The Treatment of the Criminal by the State," three lectures by Dr. Charlton T. Lewis; "Ethics and Jurisprudence;" "The Ethical Ideal of the State;" "History of Temperance Legislation." The names of special lecturers not given will be announced later.

The tuition for the entire school, including all the lectures in the three departments, will be ten dollars. Notice of the place determined upon will be published at an early date. For fuller information in reference either to the instruction or to arrangements for boarding, and the like, application should be made to Professor H. C. Adams, dean of Summer School of Applied Ethics, 1602 Chestnut Street, Philadelphia, Penn.

HEALTH MATTERS.

Vaccination in France.

THE *London Medical Recorder*, Feb. 20, 1891, says, "The French Academy of Medicine is just now the scene of a struggle between those who are in favor of a law making vaccination compulsory, and the others who think that the present permissive system goes as far as is consistent with personal liberty. The general in command of the 'volunteers,' that is to say, of those who object to compulsory protection, is no less an authority than Professor Léon Le Fort, and last week he made a vigorous rally from behind his intrenchments, and, with heavy artillery in the shape of arguments, he prevented the further advance of the attacking forces. There are several points in Professor Le Fort's address which merit attention, especially as the matter is at present under consideration in this country. First of all,—and the news will come as a surprise to those who have been in the habit of regarding France as being at the prow of civilization,—all statistics based on the mortality returns from the different diseases must be incomplete, and therefore misleading, for the cause of death is only recorded for statistical purposes in the more important French towns, and presumably not at all in the rural and smaller urban districts. What the total annual mortality from small-pox in France may be, can therefore only be matter of conjecture. Still, the professor admits that it is certainly higher than it ought to be or need be. Another fact, hardly to the credit of French provincial authorities, is, that nowhere outside Paris is any attempt made to isolate the sufferers from small-pox. He is therefore compelled to fall back upon the Paris returns; and these show that the mortality has been steadily diminishing, from 32 per 100,000 inhabitants, during the period 1865-76, 55 per 100,000 in 1880-87, to 5 per 100,000 in 1889. The returns of the Small-pox Hospital at Aubervilliers testify to the same diminution, the admissions and deaths having been as follows:—

	Admissions.	Deaths.
1887.....	1,400	215
1888.....	1,079	152
1889.....	706	63
1890.....	363	37

"There are no available means of ascertaining the proportion of cases of small-pox per 100,000 inhabitants in the country, still less the proportion of deaths to cases of infection. We are, however, told that country doctors have the greatest difficulty in procuring lymph, and the people have the greatest difficulty in getting vaccinated, even supposing they were so disposed.

"Let us compare these figures with the German statistics. It must be borne in mind that vaccination has been compulsory

throughout Germany since 1835, and in some parts since 1815. The returns are as follows:—

	Deaths per 100,000 Inhabitants.
1834.....	54
1836.....	19
1847.....	9
1856.....	7

"In 1865 the war led to a relaxation of the stringent rules in respect of isolation, and forthwith the number of deaths from small-pox jumped up to 46 per 100,000, and in the following year to 62. During the Franco-German war, small-pox was imported into Germany by the returning soldiers, and more particularly by the French prisoners of war; and the mortality from variola in 1871 attained 59,839, and 77,000 in 1872, equal to 233 per 100,000 civilians, and 31 per 100,000 of the military population. In 1874 the vaccination law was consolidated, and a vaccination service founded for the supply of lymph, and by 1877 the number of deaths (810 in 1876) had fallen to 88. This level, however, was not maintained, for in 1882 the figures had again risen to 1,007. Thereupon the German Government enjoined more stringent measures for isolation, and then the downward tendency returned, and in 1886 the number of deaths was 140 only.

"In England in 1885—a time when vaccination had long been in full swing, but when isolation was not seriously enforced—the number of deaths from small-pox in London alone was 1,419. In 1886 the number fell abruptly to 24; in 1888, to 9; and in 1889, to 1. This diminution coincided with the introduction of isolation on a large scale, which reached its apogee with the law for compulsory notification in 1889.

"Professor Le Fort argues from these figures, that, though vaccination has an undoubted and valuable influence in affording protection and in mitigating the severity of the disease, the most effective and reliable means of preventing the spread of the disease is rigorously enforced isolation.

"While it is impossible to deny the salutary influence of isolation, it seems a trifle inconsistent to object to vaccination as an infringement of the liberty of the subject, while rallying to the principle of compulsory isolation, which is as directly in contravention of personal liberty as any measure well could be. To take a patient, *non volens*, and shut him up for eight long weeks in a hospital, is surely as obvious an attack on his liberty as to insist on his submitting to the trivial operation of vaccination. This question of personal liberty, unfortunately, does not admit of any categorical reply. Different people have different ideas as to what constitutes liberty, and as to what limits, if any, are to be assigned to its play. Still, the great object that we have in view, is to secure cheerful submission to an infliction imposed by reason rather than by law; and if this could be attained by persuasion, instead of coercive legislation, then the choice would be easy."

NOTES AND NEWS.

THE Legislature of Arkansas has continued the geological survey of that State, and Dr. J. C. Branner has been re-appointed State geologist by the governor. It is expected that the work will be completed during the next two years. A report on manganese will be published by this survey in about a month.

—Miss Emma Garrett has resigned her position of principal of the Pennsylvania Oral School for the Deaf, to take effect June 20, in order to devote her time to establishing a home for the training in speech of deaf children before they are of school age. Miss Garrett will continue her Normal Training School for Teachers of the Deaf, established in 1881. She will have a summer school this year to accommodate some teachers desiring training at that time. For further particulars address her at Scranton, Penn.

—Bulletin No. 12 of the Hatch Experiment Station of the Massachusetts Agricultural College is a report on insects, by C. H. Fernald of the Division of Entomology. The history of the insects, and the methods of destroying or holding them in check, have been worked out at the station or compiled from the most reliable sources. This last has been done because there have been

so many demands for information about the common insects as to cause the expenditure of a large amount of time in answering inquiries about them. Numerous experiments on insecticides have been conducted during the past two years, but with such results that Mr. Fernald does not feel ready to report them as yet.

—In the winter and spring of 1887 and 1888, the steamer "Albatross" made a cruise from Norfolk, Va., to San Francisco, in the service of the United States Fish Commission. The collection made at this time in the harbor of Bahia, and a small collection made in deep water off Cape San Matias in north-eastern Patagonia, form the subject of a paper by David Starr Jordan, president of the University of Indiana, and containing a list of fishes obtained in the harbor of Bahia, Brazil, and in adjacent waters, published by permission of Hon. Marshall McDonald, commissioner of fisheries, in the "Proceedings of the United States National Museum," vol. xiii. The collection from Bahia includes one hundred and twelve species. As the number of specimens taken does not exceed two hundred, it is evident that the results which would have come from extensive collecting might have been exceedingly valuable.

—An ingenious process of spinning and welding copper pipe has recently been introduced in America, says *Engineering* of March 27. The inventor, Mr. J. H. Bevington, discovered that if a tube was made to enter an annular bell-mouthed die, revolving at a sufficient velocity, the diameter of the tube was reduced to that of the hole through the die, and thus a copper tube could be reduced in diameter to any desired extent. The friction between the surfaces of the die and the tube is so great that the latter is softened locally by the heat, and flows easily. If the bottom of the die be closed, the end of the tube will be welded over, and the end solidly closed. By a modification of the process two lengths of tubing can be welded together.

—The sixth annual meeting of the American Association for the Advancement of Physical Education was held in Boston, April 3 and 4. Dr. D. A. Sargent presiding. The papers read were as follows: "Is Physical Training a Trade or a Profession?" by the president; "Physical Education in Colleges," by Rev. W. D. Hyde, D.D.; "A Comparison of Measurements of Men and Women from our Colleges," by E. Hitchcock, M.D.; "The Growth of Children," by Professor H. P. Bowditch, M.D.; "The Delsarte System of Æsthetic Exercises," by Mrs. Coleman Bishop; "Physical Education in the Young Men's Christian Association," by Luther Gulick, M.D.; "Athletics versus Gymnastics at Home and Abroad," by E. M. Hartwell, M.D.; "Physical Training in the Regular Army," by Charles R. Greenleaf, M.D., U.S.A.; "Some of Galton's Tests," by Kate C. Hurd, M.D.; "A System of Gymnastic Exercises for Public Schools," by Mr. Carl Betz; "The Muscular Strength of Growing Girls," by C. L. Scudder, M.D. At the business meeting Dr. E. M. Hartwell was elected president for the coming year.

—The prizes offered by the American Economic Association for the best essays on the subject of women wage-earners have just been awarded. There were about thirty competitors for the prize. The first prize, of three hundred dollars, was given to Miss Clare de Graffenreid of Washington, D.C. The essay written by Mrs. Helen Campbell of New York received the second prize of two hundred dollars. The essayists were invited to discuss "the early and present condition of working-women; their growth in numbers, both absolutely and in proportion to population; the present extent of their sphere of labor; the economic and social evils connected with their various occupations as wage-earners, and the remedies for these evils." They were asked to deal principally with the American aspects of the subject, though it was not intended that the experience of foreign countries should be excluded. Miss de Graffenreid is a descendant of Baron de Graffenreid, one of the eminent companions of Oglethorpe, who planted a colony in Georgia. Her father was a lawyer of distinction who resided in Macon, where she was born, and spent her early days. Her girlhood was passed amid the strife and strain of the civil war. After her father's death she taught in a private school some thirteen years. She has always been interested in educational

and social questions. After her appointment, in 1886, to the position in the United States Department of Labor, which she at present holds, her studies led her into a very active acquaintance with the industrial conditions of this country. In her economic studies she has travelled over a large part of the East, West, and South. In company with Miss Dodge, she spent a month last summer in London, investigating the conditions of labor there. A recent number of *The Century* contains an article from her pen on the Georgia Cracker, and she was one of the two who equally divided a prize offered by the Economic Association in 1889 for an essay upon child-labor. This essay has been published. A paper by Miss de Graffenreid, on "The Needs of Self-Supporting Women," has also been published in connection with "Johns Hopkins University Studies in History and Politics." Mrs. Helen Campbell is a native of Lockport, N.Y. She contributed sketches to magazines and newspapers at an early age, and later gave special attention to problems relating to the condition of the poor in cities. She began in October, 1886, a series of articles on the working-women of New York, which appeared weekly in the *New York Tribune*, and was subsequently published in book form with the title "Prisoners of Poverty." Similar observations, in person, were continued the year following in London, Paris, Italy, and Germany, the results of which were embodied in her "Prisoners of Poverty Abroad." Besides this, she has written a number of novels and books on related topics. The first prize essay will probably soon be published by the association.

—A press despatch from Paris, dated April 10, says that an enormous reservoir of water one hundred and twenty feet below the surface has been discovered at El-Golea, a small caravan station in the midst of the Sahara Desert. The reservoir was discovered while a number of workmen were sinking a well at El-Golea. The shaft sunk already gives forty gallons of good, clear water per minute, and it is expected that this amount can readily be increased should it be found that a larger quantity is necessary. This is said to be the first time that water has been found at so slight a depth in the Sahara.

—An appeal for funds for aiding in the teaching of speech and lip-reading to the deaf has been issued by William Pepper, provost of the University of Pennsylvania; D. Hayes Agnew, M.D.; Emma Garrett, principal of the Pennsylvania Oral School for the Deaf, Scranton, Penn.; Horace Howard Furness; Lawrence Turnbull, M.D.; Charles S. Turnbull, M.D.; J. Solis-Cohen, M.D.; Harrison Allen, M.D.; Wharton Sinkler, M.D.; Edw. H. Magill, ex-president of Swarthmore College; Charles C. Harrison; Thomas Chase, ex-president of Haverford College; and Mary S. Garrett. In the appeal it is stated that it has been demonstrated that deaf children can be taught speech and lip-reading, be educated, and be enabled to communicate with their families and friends through the same; and a number of pure oral schools for such instruction are in existence in the United States. To the complete success of the method, however, it is necessary that these deaf children should be guided and trained to speech from the age when hearing children begin to learn to talk. As the majority of these children are poor, and as all mothers, even of those who are not poor, do not understand how to train them to speech, Miss Fuller, principal of the Horace Mann Day School for the Deaf (pure oral), Boston, established, two years ago, a home for the training in speech of deaf children before they are of school age. The necessary funds for commencing the good work in New England were raised by the mother of a successfully trained deaf child. The children are, of course, under the care of persons specially trained for that purpose, and their progress already gives great encouragement. Miss Fuller, who has been principal of the Horace Mann Day School for the Deaf for many years, says, "Does it not seem almost unaccountable that the earliest years of deaf children's lives have been so long overlooked in the plans for their mental development?" It is proposed to establish in the Middle States, as speedily as possible, such a home as Miss Fuller has established in New England; and the public are earnestly requested to contribute to the endowment fund required for the same. Subscriptions may be sent to Frank K. Hipple, 1340 Chestnut Street, Philadelphia, Penn., who has consented to act as treasurer.

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LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.**

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

The Horned Saurians of the Laramie Formation.

IN 1872 Professor Cope made known the remains of a very large dinosaurian reptile from the transition beds of Wyoming, whice he named *Agathaumas sylvestris*. The portion of the skeleton found "rested in the midst of vegetable debris, as sticks and stems, and was covered with many beautiful dicotyledonous leaves, which filled the interstices between the bones." The animal was discovered near Black Buttes Station, on the Union Pacific Railroad, fifty-two miles east of Green River, and near the Hallville Coal-Mines. Professor Cope succeeded in recovering sixteen vertebræ, including a perfect sacrum, with dorsals and caudals; both iliac and other pelvic bones, those of one side nearly perfect; some bones of the limbs, ribs, and other parts not determined. Professor Cope's description is thus:—

"The vertebræ are large. The dorsals are short, with vertically oval centra and small neural canal. The diapophyses originate well above the neural canal, diverge upwards, and are triangular in section. The neural spine is very much elevated, and the arch short antero-posteriorly. The zygapophyses are close together in both directions, those of the same aspect being separated by a narrow keel only. They do not project, but consist of articular surfaces cut into the solid spine. The latter is flat, and dilated distally. The articular faces are nearly plane, with a slight median prominence. The ribs have two articular surfaces, but I found no capitular pit on the dorsal centra.

"Elevation of centrum, 7.5 inches; width of the same, 5 inches 7.5 lines; length of same, 3 inches 8.5 lines: total elevation of a dorsal vertebra, 28 inches 3 lines. The sacrum consists of five vertebræ, the anterior centrum not depressed. They give out huge diapophyses, which are united by suture. They are themselves united distally in pairs, each pair supporting a longitudinal convex articular face for the ilium. Each pair encloses a perforation with the centra. The first diapophysis goes off from the point of junction of the first and second vertebræ; the second from the third only, and is more slender. The total length is 25 inches, and the width 30 inches. Its vertebræ are flat below, with latero-inferior angles. The last centrum gives off a simple diapophysis. . . . The iliac bone is extended antero-posteriorly. One extremity is thick and rather obtuse, but of little depth. There is a large protuberance above the acetabular sinus. The other extremity is dilated into a flat, thin plate of rather greater

length than the shorter extremity. The total length is about four feet, of which the acetabular sinus measures about 8.10 inches."

Professor Cope continues, "From the above description, it is evident that the animal of Black Buttes is a dinosaurian reptile, the characters of the sacral and iliac bones alone sufficing to demonstrate this point." It is pronounced the largest dinosaur described from North America.

This animal was described again and figured by Professor Cope in the "Vertebrata of the Cretaceous Formations," 1875: "On eight (and perhaps nine) vertebræ, anterior to the sacrum, there is no indication of the capitular articular facet for the rib [on the centrum]. This facet is found, as in *Crocodylia*, at or near the base of the elongate diapophyses. The centra are slightly concave posteriorly, and still less so on the anterior face, with gently convex margins. The neural canal is very small, and the neural arch short and quite distinct from the centrum, having scarcely any suture. The diapophyses are long and directed upwards. They are triangular in section."

The sacrales are then described, and the opinion is expressed that the tail is small: "The reduced and rather elongate form of the last sacral vertebra induces me to believe that this animal did not possess such large and short caudal vertebræ as are found in the genus *Hadrosaurus*, and that the tail was a less massive organ."

There cannot be any doubt that we have in *Agathaumas* a form widely different from any thing described before, clearly characterized by its peculiar sacrum and ilium.

Professor Marsh has created a new name, *Triceratops*, for this genus. That *Triceratops* is the same as *Agathaumas* will be admitted by everybody who will compare the figures published by Professor Cope, of the sacrum, the ilium, and the posterior dorsals, with the corresponding figures given by Professor Marsh. In the *American Journal of Science* (February, 1891) Professor Marsh makes this statement, "The posterior trunk vertebræ have also short, flat centra, but the diapophyses have faces for both the head and tubercle of the ribs, as in crocodiles, a feature not before seen in dinosaurs." Exactly this condition exists in *Agathaumas*, but also, as is well known, in *Iguanodon*. I think any further comment on the identity of *Agathaumas* and *Triceratops* is useless. Everybody can satisfy himself of this fact by comparing the figures of Professors Cope and Marsh.

I shall now show that *Ceratops* Marsh is the same as *Monoclonius* Cope.

In 1876 Professor Cope described a new, very remarkable dinosaur from the Fort Union beds of Montana, under the name of *Monoclonius crassus*.

"*Char. Gen.* — Teeth with obliquely truncate face and distinct root, which is grooved for the successional tooth on the front; no external cementum layer; caudal vertebræ biconcave, and brim narrow; fore-limbs large and massive. The teeth of this genus resemble those of *Hadrosaurus*, and, like them, are replaced from the front, — an arrangement which precludes the possibility of more than one series of teeth being in functional use at one time. The robust fore-limbs and elongate ilium distinguish *Monoclonius* [misprinted *Diclonius*] from *Hadrosaurus*. From *Trachydodon* it differs in the absence of the rough cementum layer on the back of the tooth.

"*Char. Specif.* — The faces of the teeth are acuminate oval in form, and are divided by an elevated keel, which is median above, but turns to one side at the base; margin crenate, the grooves extending more or less on the curves back, which is otherwise smooth; sacrum with ten vertebræ; the last centrum much compressed; the diapophyses extending horizontally from the neural arch above, and connected by a vertical lamina with the iliac supports; length, 27.33 inches. The bones of the limbs are robust, the hinder the longer, but not so much so as in some other genera. Length of femur, 22 inches; width proximally 7.4 inches, distally 6 inches. Length of tibia, 20 inches; greatest diameter proximally 8 inches, distally 7.25 inches. The three anterior dorsal vertebræ are co-ossified, and the first exhibits a deep cup for articulation with the preceding vertebra. The episternum is a T-shaped bone, thin, and keeled on the median line below. Length of transverse portion, 21 inches."

It is evident that the structure of the sacrum at once shows the close affinity of this genus to *Agathaumas*. The description of the sacrum can be applied fully to the sacrum figured by Professor Marsh under the name of *Triceratops*. The description of the fore and hind limbs also agrees very much with that of *Triceratops*, and there is not the slightest doubt that *Monoclonius* belongs to the same family. *Monoclonius* and *Ceratops* are from the same locality, Cow Island, Montana; and the portions of the skull figured by Professor Cope (*American Naturalist*, August, 1889) leave no doubt whatever that *Monoclonius* is identical with *Ceratops*. The elements formerly considered by Professor Cope as episternum represent the parietals. I know and have examined the types of *Monoclonius* and *Ceratops*, and can state that the two forms are not generically distinct. In the April number of the *American Journal of Science* a restoration of *Triceratops* is given by Professor Marsh. I think there is no evidence that the animal had such a long tail as the restoration shows. The post-pubis, the presence of which I had predicted (*American Naturalist*, June, 1890), is not represented. In the February number of the *American Journal of Science* Professor Marsh makes the following remarks about the pubis: "One pubis recently discovered has a short, splint-like process, which may, perhaps, be a remnant of a post-pubic element, although it does not have the position of the post-pubic bone in other dinosaurs." Now, there cannot be the slightest doubt that this process is the same element as in the other *Iguanodontia*, and I do not see that it differs in position. The "splint-like process" is not complete behind, and I predict again that this process extended very much farther behind, just as in the allied *Iguanodontidæ*.

One of the characters now given by Professor Marsh to the horned saurians consists in the presence of a pineal foramen. This is evidently a mistake. The foramen described as a pineal foramen has nothing whatever to do, even if it really exists in all the skulls, with the true pineal foramen. This foramen is absent in all *Iguanodontia*, and it certainly would not make its appearance again in such a highly specialized animal as *Agathaumas*. I have nothing to add in regard to the teeth. I repeat, that they have not two true roots (compare the *American Naturalist*, June, 1890). The lumbar of the *Agathaumidæ* are not absent, as stated by Professor Marsh, but are simply co-ossified with the sacral vertebrae. The statement that the post-frontals meet in the middle line I take the liberty to doubt.

The *Agathaumidæ* (this is the only name which can be given to this group) represents a highly specialized family of the *Iguanodontia* (*Orthopodu*), the nearest allies of which are exhibited by the *Iguanodontidæ*.

The *Agathaumidæ* contain two forms which are well defined (I neglect here the horned saurians *Crataemus* of the Gosau formation, Austria, of which only fragments are known),—*Agathaumas* Cope, 1872 (*Bison* Marsh, 1887; *Triceratops* Marsh, 1889; *Sterrhopholophus* Marsh, 1891), and *Monoclonius* Cope, 1876 (*Ceratops* Marsh, 1888). *Polyona* Cope, I think, is also a synonyme of *Agathaumas*.

This result is different from that reached by Professor Marsh, who states in the February number of the *American Journal of Science*, 1891, "The generic names *Agathaumas*, *Crataemus*, *Monoclonius*, and one or two others, have been given to fragmentary fossils which may belong to this group; but these remains, so far as made known, appear quite distinct from those here described" (*Ceratops*, *Triceratops*).

G. BAUR.

Clark University, Worcester, Mass., April 2.

The Shrike.

A PLEASANT article, chiefly concerning the shrike, or butcher-bird,—one of John Burroughs's bright articles,—calls to my mind some questions concerning the food of the shrike. Burroughs says that the shrike kills lizards, toads, birds, etc., by striking them on the head, then eats the brains only, and hangs up the carcass. What for?

Professor A. Newton, in "Encyclopædia Britannica," says the shrike hangs up its prey, or impales it, for greater convenience in tearing the carcass to pieces in order to devour it. I have seen a

shrike's nest *in situ*. Around it hung a beetle, a mouse, a small bird, and a big bumble-bee. All were within reach of the bird as she sat on her eggs. A dart forward of her head brought her beak upon any one of these victims. For what were they hung up? For traps, I venture to suggest.

The shrike, no doubt, strikes its prey on the thin skull-bone. Let us say that instinct teaches that here is the spot most vulnerable for a beak no larger than that of the shrike. The exposed brain presents a soft eatable morsel, and the shrike eats it *en passant*. Then it hangs up its booty, and straightway the decaying carcass attracts insects, blue-flies notably, and thereon the shrike feasts. I believe that the shrike is chiefly insectivorous; and its habit of hanging up plunder, making a kind of larder all about its nest, is to call there plenty of large flies, which can be safely picked off as the bird sits on her eggs. True, the shrike hangs up carcasses far from its nest; but to these carcasses it can return frequently for the flies they have attracted. No doubt the instinct which suggests converting the vicinage of the nest to a shamble will prompt the bird to hang up whatever is killed by it, in the place nearest at hand.

JULIA McNAIR WRIGHT.

Fulton, Mo., April 7.

Iroquoian Etymologies.

In an article in *The American Anthropologist* (vol. i. No. 2) suggesting an Algonquian origin for the word "Iroquois," the writer had occasion to criticise a derivation given to this word by Mr. Horatio Hale, in his "Iroquois Book of Rites." This criticism is as follows:—

"Mr. Hale finds what he believes to be at least a possible origin in the indeterminate form of the Iroquois word *garokwa* ('pipe,' or 'string [error for "portion"] of tobacco'), *ierokwa* ('they who smoke,' briefly 'tobacco people'), the Iroquois being well known to have cultivated tobacco. With reference to this derivation, I am not aware that *garokwa* is used as a verb in any of the Iroquoian tongues. If not so used, it cannot, of course, have an indeterminate form, *ierokwa*; if this form existed, it would mean, not 'they who smoke,' but 'one smokes by which.'"

In the next issue of the quarterly named above, Mr. Hale tried, in "Indian Etymologies," to defend his erroneous derivation which had been called in question by the writer. Among other things equally remarkable, he says, "I have no desire to criticise it, but may be allowed to vindicate my own suggestion from the imputations of ignorance or carelessness, which his objections seem to imply. For this object it is not necessary to claim a profound knowledge of the Iroquois tongue, which is one of the most difficult of languages; but Mr. Hewitt, who has read my volume on the 'Iroquois Book of Rites,' might, perhaps, have reasonably given the author credit for a more careful study of the first principles of the language than he seems willing to suppose. With reference to my suggested derivation of the word from the verbal form *ierokwa* ('they who smoke,' reminding one of 'The Tobacco People,' which was a well-known designation of a Huron tribe), Mr. Hewitt remarks, 'I am not aware that *garokwa* is used as a verb in any of the Iroquoian tongues.' If he will refer to the volume just mentioned, he will find, on p. 116 (paragraph 2), the word in question used as a verb in this native composition. The form here employed is *denighroghkwaïen*."

If *denighroghkwaïen* were an instance of the stem of *garokwa* used as a verb, it would prove Mr. Hale's position and the justness of his remarks; but, unfortunately for Mr. Hale, it is not such an instance. This will be shown in the sequel.

Moreover, Mr. Hale's contention that a mere superficial knowledge of the tongue is sufficient preparation to enable one to analyze accurately its terms and sentences is inconsistent and self-contradictory: since, if it be true that the Iroquoian tongue is "one of the most difficult of languages," then, before putting forth any etymologic analysis of its vocables and sentences, it is not only necessary, but imperative, to have a knowledge of its grammatic and morphologic processes sufficiently "profound" to enable the student attempting an etymology to ascertain the several parts of speech, their flexions, and their positions in sentence-words, because such a knowledge will prevent him from mistaking the

several parts of speech for real or fictitious flexions, and will prevent him from dividing sentence-words and derivative words in a capricious and erratic fashion, to give plausibility to etymologies and methods of verbal analysis based on a fatuous misconception of the structure of the language.

Moreover, the discriminating student, in pursuing his researches, will soon find that there is no published work on Iroquoian etymology and grammatic usage sufficiently elementary and accurate to be considered decisive authority in such matters; and whoever relies mainly or exclusively on published materials for his data and proofs should not be surprised to learn that his work is not scientific and not trustworthy, and that he labors without profit and without the attainment of truth.

Before beginning his analysis of *denighroghkwaïen*, Mr. Hale changes its spelling to *tenirokwaïenn*, in an attempt, as afterwards appears, to give validity to his fanciful derivation of it.

Mr. Hale puts forth this analysis in the following language: "*teni*, 'we two' (thou and I); *rokwa*, the 'theme' of the noun *garokwa* or *karokwa* ('pipe'); *i*, a vowel inserted for euphony; and *en* (or *enn*), the terminal inflection of the present imperative, in the second conjugation."

This alleged derivation is erroneous, and clearly at variance with all the structural and grammatic principles of the language.

For orthoepic reasons, the writer will employ, in the present analysis, the orthography *tenihrokuayēñ* instead of the spelling adopted by Mr. Hale.

The true etymology of *tenihrokuayēñ* is as follows: *te* (meaning "two") qualifies the noun-stem; *ni* (denoting "thou and I") is the pronominal prefix of the inclusive dual first person; *hrokua* (denoting "pipe," and "a portion of tobacco") is the noun-stem; *yēñ*, Mr. Hale's *ienn* (signifying "to place," "put," or "lay down"), is the verb-stem, being in the exhortative mode, which in this language has no mode-sign, notwithstanding Mr. Hale's unfounded assertion to the contrary. Hence etymologically this sentence-word means, "Let thee and me lay [our] two pipes down," and figuratively, "Let thee and me smoke." It is thus evident that *tenihrokuayēñ* (for *denighroghkwaïen*) is not an instance of the noun-stem *hrokua* used as a verb.

Thus it is seen that Mr. Hale errs, first, in making the dual numerative *te* a part of the pronominal prefix; second, in virtually begging the question by miscalling the noun-stem *hrokua* a "theme," to give some plausibility to his erroneous assumption that it can have, as required, either a nominal or a verbal office, better to accord with his illusive treatment of it in his supposed etymology; third, by mistaking a common verb for an "inflection" unknown to the language, by his division of the well-known verb *ienn* (*yēñ* in the writer's lettering) into a vowel *i* for euphony, and his supposed mode-sign, *enn*.

In Iroquoian grammar the fact that a certain stem is combined with verb-stems to form compound or sentential words, is conclusive evidence that such a stem belongs to the class of generic or abstract nouns which cannot have a verbal function in addition to their nominal office.

A generic noun is one the stem of which may be compounded with verb-stems and adjective-stems, and one that cannot be a verb. When not in combination, i.e., when standing alone, its stem must have a prefixed pronominal gender-sign, and commonly a final vocalic sound which generally undergoes transmutation when the stem is compounded with other elements.

In the "Iroquois Book of Rites" (p. 120, Section 9) appears the sentence-word *tetyathrokuanekeñ*. There it is faultily printed as written in the original manuscript, thus,—*thadetyatrogkwañekenh*,—and its common but metaphoric meaning, "Let thee and me smoke together," is also given. The initial *tha* is evidently the misspelled contracted form *tho* of the locative adverb *e'tho* ("there"), which is not a proclitic, and should not therefore be treated as such. The etymologic elements of this sentential compound are the following: *te* (meaning "two") qualifies the noun-stem; *ty* (for *ni* by regressive assimilation) is the prefix pronoun of the inclusive first person dual, meaning "thou and I;" *at* (for *a't*, sometimes the sign of verbal reflection) has here rather a possessive force, denoting "our" or "our own," and qualifies the noun-stem; *hrokua* (meaning "pipe," "a portion of tobacco") is

the noun-stem; *nekeñ* (signifying "to set or place, together or side by side") is the verb-stem, being in the exhortative mode. Therefore the compound means literally, "Let thee and me place together our own two pipe[s]," and metaphorically, "Let thee and me smoke together."

The following examples confirmative of the abstract nominal character of the stem *hrokua* are cited from the "Radices Verborum Iroquæorum" of Father Bruyas, as published by Dr. Shea. These sentential compounds, although recorded for more than a hundred and seventy-five years, show that when they were recorded, *hrokua* was used strictly as the stem of a generic noun, and in exact accordance with the genius of the language. The forms in parenthesis are in the lettering of Father Bruyas; and the others, in the writer's orthography, are severally lettered to express their orthoepy. The first of these citations is *kahrokuēñta'o* for *kahrokuēñta'o* (*garokwentao*), i.e., "One has finished smoking," but literally, "One has ceased from [his] pipe or tobacco." Its etymology is as follows: *ka*, "one" (a person); *hroku-* for *hrokua*, "pipe" or "tobacco;" *ēñtā*, "to stop," "end," "cease from," "finish;" and *o*, the sign of the perfect tense. This verb *ēñtā* is erroneously classed under "Accidents Verbaux," with the title "Du Consomptif," by Father Cuoq in his "Judgement Erroné" (p. 65). It is, however, a verb, and not a flexion. The next is *ronathrokuayēñto* (*atrokwajenton*), i.e., "They severally have their own pipes or tobacco," but literally, "They severally have laid down their own pipe[s] or tobacco." Its analysis is as follows: *ron* (meaning "they") is the plural masculine third person of the prefix pronoun of the anthropic gender; *at* (usually the sign of verbal reflection) is here the mark of possession, meaning "(their) own;" *hrokua* (denoting "pipe" or "tobacco") is the noun-stem; *yēñ* (signifying "to place" or "lay down") is the verb-stem, which in the perfect tense means "to have or possess;" *to* (denoting "severally" or "individually") is the distributive flexion; " " (an apostrophe) is here the sign of the perfect tense, and represents a suddenly interrupted guttural sound. This peculiar sound, although of the first importance and of essential and indispensable use in Iroquoian etymology and phonology, has, with a single exception apart from the present writer, been overlooked and disregarded by the students past and present of the language of the Iroquois. The Rev. Asher Wright, who, until his death in 1875, was a missionary among the Senecas in the State of New York, refers to this significant sound in his Senekan "Spelling-Book." While speaking of the phonology of the language, he says, "This letter (*h*, *H*) never precedes a vowel; following one, it should be spoken by giving the vowel an explosive force, and breaking it off suddenly, in such a manner as for the instant to stop the breath entirely. . . . This sound is very abundant in Seneca, and, used in conjunction with certain other modifications, the mode and tense of verbs, and various other circumstances, are denoted by it. Often, also, it forms the chief distinction between words of very dissimilar meaning. No one can read or write Seneca intelligibly who does not pay the strictest attention to this character." . . . These important remarks are equally pertinent to all the other dialects of the Iroquoian tongue, including the Tserokian dialects.

The third citation is *ronathrokuakhaho* (*atrokwaghahon*), i.e., "They severally are apart smoking," but literally, "They severally have their pipes apart." The pronominal and the nominal parts being the same as those explained in the last example, it will be needful here to speak only of the verb and its flexions. The verb-stem is *kha*, and means "to separate," "divide," or "have apart;" *ho* is here the distributive flexion, meaning "severally," "individually;" " " , previously explained, is the sign of the perfect tense. The last citation from Bruyas is *twathrokuanekeñ* (*twathrokuanneken*), i.e., "Let you [plural] and me smoke together," and literally, "Let you [plural] and me place our own pipes together." The following is the analysis of this compound: *tw-* (signifying "ye and I") is the inclusive plural first person of the prefix pronoun; *at* (commonly the sign of verbal reflection) means here "our," "our own;" *hrokua* is the noun-stem, denoting "pipe" and "a portion of tobacco;" *nekeñ* (meaning "to set or place together or side by side") is the verb, being in the ex-

¹ These letters should have an oblique line through them.

hortative mode, which, as has been said, possesses no distinctive mode-sign.

These several examples of the compounding of the stem *hrokua* with different verbs furnish conclusive evidence that it is a noun-stem, and that it is never used as a verb: hence it cannot, of course, have an "indeterminate verbal" form *yehrokua*, although Mr. Hale has been misled to believe it can have.

In the writer's article first above mentioned the conjectured "indeterminate verbal" form *yehrokua* (Mr. Hale's *ierokua*) was rendered "one smokes by which" by the writer, instead of the words "they who smoke," suggested by Mr. Hale.

Evidently overlooking the reasons for the correction, he says, "The indeterminate form, however, is constantly used with a plural signification." The writer's correction, however, was intended primarily to show that if *yehrokua* were a verb, ending as it does in *kua*, which with verbs is the instrumental sign, it would have an instrumental or causative meaning in addition to its assumed predicative meaning, "one smokes;" second, to emphasize the important fact that *ye*, its pronominal prefix, has not a relative meaning, expressed by "who" in Mr. Hale's rendering, for it is certain that in this language there is no pronominal prefix which has in itself both a nominative and a relative meaning, and also to show the writer's preference for rendering a singular pronoun by an equivalent of a like number. Furthermore, the correction was intended to bring to view the all-important fact that since a sentence-word in the instrumental or causative mode predicates the means or instrument of an action or a state or condition of being, it may become the descriptive name of that means or instrument, and, lastly, it may become a generic noun through further development; and that it may not become a name of the same thing or things of which its nominative prefix pronoun is also a name, as implied in Mr. Hale's faulty translation and unfounded etymology of this conjectured verbal form. These are among the chief reasons why the writer objected to the derivation of the word "Iroquois" from the supposed verbal form *yehrokua*.

Only a misconception of the grammatic and morphologic structure of the Iroquoian tongue could be the basis of the errors and linguistic fallacies to which Mr. Hale has given utterance in the following language. He says, "The manner in which Iroquois verbs are formed from nouns, and in turn yield nouns expressive of agency or condition, will be apparent in the inflections of the word *kanonsionni*, the well-known name of the Iroquois confederacy. It means literally 'the extended house,' from *kanonsa* ('house') and *ionni* ('to extend' or 'lengthen out'). Replacing the noun-forming prefix *ka* by the verb-forming prefixes, we have, in the third person, singular and plural, *ranonsionni* and *rotinonsionni*, literally 'he [who] extends the house,' and 'they [who] extend the house,' but understood to mean 'he is an Iroquois,' 'they are Iroquois;' or, as nouns, simply 'an Iroquois,' 'the [plural] Iroquois.'" This is a series of erroneous statements.

Now, a "noun-forming prefix" and "verb-forming prefixes" are unknown to this language. Mr. Hale's ascription of such a novel office to the prefix pronouns of this language is therefore pure fancy.

The very prefix *ka*, which he calls a "noun-forming prefix," has no such function, as it is a prefix pronoun; and the sole office performed by the prefix pronouns of this language is to express, more or less clearly, person, number, case, and, in third persons, gender and generally sex.

The pronoun *ka* cited above is used indifferently with verb-stems, adjective-stems, or with noun-stems; and yet it does not transform the verb-stems and the adjective-stems into noun stems, which it would most assuredly do had it a "noun-forming" function. It is a pronominal affix to the following and other verbs, — *kanonhwe's*, "it loves, cherishes, [it];" *kāhnino's*, "it buys [it];" *kahraraks*, "it bores [it];" *kakē's*, "it sees [it];" *karyūs*, "it kills [it];" *kariks*, "it bites [it];" — and yet these verb-stems do not become noun-stems. This fact is conclusive evidence that the prefix pronoun *ka* has not a "noun-forming" office.

Moreover, as Mr. Hale substitutes the masculine prefix pronouns *ra* and *roti* (the latter erroneously for *rati*) for the prefix *ka*, they

must be, therefore, two of the "verb-forming prefixes" mentioned by him. But with what has been said concerning the prefix pronoun *ka*, and the general purpose of the pronouns, it is only needful to add here that the pronouns *ra*, *rati*, and *roti*, mentioned above, are used indifferently with noun-stems, adjective-stems, and verb-stems; and yet the nominal and the adjective-stems do not become verb-stems, as they would if the prefixes *ra*, *rati*, and *roti* possessed "verb-forming" powers. The following examples confirm what has just been said, — *roti'niko,ra'*, "their [masculine] mind;" *raorihwa'*, "his matter, business;" *rotirihwa'*, "their [masculine] matter, business;" and the following with adjectives, — *rahoñ'tei*, "he [is] black;" *ratihoñ'tei*, "they [are] black;" *ranaye*, "he [is] proud;" *ratinaye*, "they [masculine] are proud;" *rakowanēñ*, "he [is] large;" *raticowanēñ*, "they [are] large."

These facts make it clear that Mr. Hale is wholly mistaken as to the nature and office of the prefix pronouns in this language.

Again, judging by his translations, it is evident that he employs the letters *ionni* to express two very distinct forms of the verb-stem *yoññi*, — the present of the indicative, and the perfect tense participle, — a distinction of which he appears to be unaware. The stem of the present may be accurately lettered thus, *yoññi*; and that of the participial form thus, *yoññi'*. In both, the final vowel *i* is short, but in the latter case followed by the peculiar and important sound represented by "'" (an apostrophe).

Mr. Hale's rendering of his *ranonsionni* and *rotinonsionni* by "he [who] extends the house" and "they [who] extend the house," respectively, shows that he was unaware of the fact that the two prefixed pronouns were peculiar to different tenses, and that consequently they could not be rendered in the same tense, else he would have indicated this fact in his orthography and translations of the two forms cited; and his interpolation of the relative "who" in these translations is gratuitous and fanciful, for reasons already stated elsewhere in this article.

In Mr. Hale's orthography, the letters *nonsionni* express the compound stem of the sentence-word *kanonsionni*. The writer will represent this stem with the following letters diacritically marked; thus, *no^syoññi* for the present of the indicative, and *no^syoññi'* for the perfect tense participle of the same mode.

The forms *rano^syoññi* and *ratino^syoññi* may be respectively rendered, "he extends, is extending, the house," and "they [masculine] extend, are extending, the house;" but *rono^syoññi* and *rotino^syoññi*, by "it or he extends, is extending, his house," and "it extends, is extending, their [masculine] house." These forms are in the present indicative, but the change of signification wrought by the change of the forms of the prefixed pronouns is noteworthy. The forms *rano^syoññi* and *ratino^syoññi* may be respectively rendered "he-house-extended-[is]" and "they [masculine]-house-extended-[are]," and freely, "he is, they are, an extended-house;" *rono^syoññi* and *rotino^syoññi*, by "his-house-extended-[is]" and "their [masculine]-house extended-[is]," i.e., "his, their, house is extended." The last four sentential forms are participial, the substantive verb being commonly understood in the present tense of the discourse.

The participial sentential forms are expressive of a state or condition of being, and for this reason only can they convey the "idea" of "a man of the extended-house." For this reason it is imperative to distinguish carefully between these and the verbal sentential forms of the present of the indicative.

In addition to the foregoing corrections of Mr. Hale's errors as to the first principles of the language, it is necessary to add that the participial forms may be translated correctly only by the sentences "He is an Iroquois" and "They [masculine] are Iroquois," and not by the titular and cognominal words "an Iroquois" or "the Iroquois." Sentences are translated with complete and formal accuracy only by sentences. Each of the mooted verbal combinations forms a sentence, — a combination of parts of speech making together complete sense.

Mr. Hale's assertion, as explained by himself, that "the manner in which Iroquois verbs are formed from nouns, and in turn yield nouns expressive of agency or condition, will be apparent in the inflections of the word *kanonsionni*," is therefore at variance with the structural laws of the language.

Such faulty and inaccurate work must necessarily shake the confidence of scholars in the trustworthiness of the results of linguistic methods and theories such as those herein criticised.

To allow etymologies and methods of linguistic research such as those just criticised to pass unchallenged, and to leave them without pointing out the misconceptions upon which they are based and the fanciful reasonings wrought in their support, would be tantamount to accepting error and fancy for truth. Although it is proper to deprecate "wasting our time in minute verbal criticism of the work of our fellow-students," yet it is difficult to avoid seeing that it is imperative on scholars, in every department of science, to test the work of their fellow-investigators by rigid and discriminating analysis; and, if they fail to perform this their most evident duty, the student unfamiliar with the subject-matter will be left to assume that faulty and inaccurate work rests on a foundation of fact, and will be more than likely, especially in the beginning of his career, to make it the basis of further research, and, of course, new error.

In conclusion, it should be borne in mind that those who will not, personally and without preconceptions, study this language, and who appear to be unable to see any thing on which the light of their theories does not fall, and who do not "profess to distinguish the niceties of Indian pronunciation," although these so-called nice distinctions are, in fact, the marks and indices of essential grammatic and morphologic elements, must not hope to accomplish, in the domain of Iroquoian etymology and morphology, trustworthy and accurate work.

J. N. B. HEWITT.

Washington, D.C., Jan. 28.

A Double Motion of Clouds.

It is generally accepted that our storms and high areas drift in the upper currents of the atmosphere, and that the direction of motion of clouds will give us important information as to the direction of the former. The present writer has devoted most careful attention to this subject for more than three years and a half, and has found that while clouds, especially the higher forms, have a general tendency to move in the same direction as storms, that is, from west to east, yet they are a very poor guide to follow in special instances, and they fail especially at times when such assistance is the most needed. This may be in part due to the fact that the upper clouds cannot be seen in the neighborhood of storms, and in part to the difficulty of estimating the height of clouds. In the case of high areas, the clouds frequently are less than three-tenths, and, if so, their direction does not appear on the maps. Much time has been spent in watching the motion of clouds at all hours of the day, and it is possible that a very important factor in their motion has been omitted.

Every one has remarked the beautiful cirrus stripes which are often seen traversing the sky, usually from south-west to north-east. I have gleaned the following statements from various authorities. Van Bibberspeaks of them as resembling trees on the streets. This probably refers to the narrowing effect due to perspective. He also says, "These formations were given by Humboldt the ill-suited name 'polar bands.'" Kaemtz says, "In Germany these clouds are known under the name of 'wind-trees' (*Windsbaume*)."

In a footnote Martius says, "The tendency which the cirri have to arrange themselves in parallel bands is remarkable; and it proves that the cause which directs their filaments to one azimuth rather than another, instead of being merely local and accidental, extends to great distances. By a well-known law of perspective, parallel bands ought to appear diverging from one point of the horizon, and converging at the point of the horizon diametrically opposite. The phenomenon occurs more frequently in Lapland than in the temperate zone. Humboldt found that at the equator the bands were generally directed from north to south. The cause, which thus arranges the great axes of these clouds according to parallel lines, is still unknown. Forster was the first who made the very just remark that these clouds almost always travel along a parallel to their great axis, which greatly contributes to render them apparently motionless. Many meteorologists (Howard, Forster, Peltier) seem to believe that the cirri serve as conductors between two distant foci of

electricity, of opposite names, which tend to combine, and that the flexibility of the conducting clouds terminates in the rectilinear form, which is necessitated by the condition of the shortest path from one focus to the other." Loomis says, "The direction of the parallel bands generally coincides with that of the wind, and it has been suspected that these lines of cloud serve as conductors of currents of electricity, and this may be the agent which causes the clouds to assume such artificial forms." A more guarded statement than this it would be difficult to put forth.

Abercromby of England has probably given more attention to these motions than any one else. He speaks of the appearance as being known as "Noah's Ark" in England. "Frequently we see the curious spectacle of a long stripe of cloud moving either broadside on or obliquely to its length. As we must suppose that a stripe always sails with the wind in which it floats, we have to find out how a stripe can be formed which moves across its length. At first sight, this is one of the most puzzling phases of cloud-motion. These formations of clouds are, however, exactly analogous to the smoke left by a steamer running before the wind. If she runs faster than the wind, her smoke trails behind; but if the wind blows faster than she steams, then the smoke is blown forwards in front of her." He then shows that if the direction of the steamer is not that of the wind, the line of smoke will form an angle with the former. "Now, this is exactly what happens in nature. The ascensional column of moist air, which will eventually form a cumulus, starts from near the earth's surface, drifting with the wind which blows there; when it arrives at a certain height, it meets an upper current moving in a different direction to that on the surface, and probably begins to condense there. The stripe which would be formed under these circumstances would behave exactly like the smoke of a steamer; that is to say, it would lie obliquely to the wind which was driving it." Any one who is desirous of learning more of these views and observations will find them in "Weather," pp. 84-91.

I have made these quotations very freely from all the authorities I have at hand, fourteen in all, as it seems to me the subject is of the highest importance, and has been very much neglected up to the present. My own observations are as follows. In a perfectly clear sky these clouds will come up from the south-west, and move gradually to the north-east. When the stripes are overhead, a double motion is often very easily recognized. One of these may be quite rapid, and I have often noticed that it coincided with the north-west wind or at right angles to the stripe. From observations on Mount Washington and of cirrus in Europe, this velocity may be a hundred or even a hundred and fifty miles per hour. At the same time, it is not a difficult matter to recognize a second motion directly in the line of the stripe. This motion may be a third or a fourth that of the other, and sometimes it is very much slower. Observation indicates that this second motion is often, if not always, in the direction of the storm which is then near the station. If this can be incontestably established, it will be seen what an extraordinary advance will be made in our studies. We shall see, then, that this marked movement of the upper current which first attracts our attention, and so often masks the second motion, is, after all, the less important as relates to the movement of the storm. The greatest interest centres about the cause of this second motion. It is evident that these stripes do not form conductors of electricity, because their motion occurs in lines where there are no clouds. Is it not probable that this current exists in the first place? During the last maximum of sunspots, I observed very carefully an electric light playing in cirrus stripes in my zenith, and mentioned the fact to others. I have also observed a motion in auroral beams which was not so very different from this second motion of cirrus stripes. The suggestion made by Mr. Abercromby, that this second motion takes its origin in a lower cloud, which keeps its direction after rising to a higher level, cannot be accepted at all. Such a motion as that would be very quickly brought to rest instead of being in existence for a hundred miles or more. Moreover, the origin of these beautiful and regular cirri cannot possibly be in irregular masses of cumulus rising heterogeneously from a lower to a higher level.

It seems to me that there are needed just now a careful series

of observations, showing (1) the extent of this second motion on different sides of a storm or high area, (2) the relation of the direction of this second motion to that of the storm or high area, (3) the cause of this motion, etc. At the same time, the facts and views here presented show that this subject is of the greatest interest, and may be of the highest importance.

H. A. HAZEN.

Washington, D.C., April 11.

BOOK-REVIEWS.

Die Mutter bei den Völkern des Arischen Stammes. By MICHAEL VON ZMIGRODZKI. Munich, 1886.

La Question de la Femme c'est la Question de la Mère. By MICHAEL VON ZMIGRODZKI. Paris, 1890.

Zur Geschichte der Suastika. By MICHAEL VON ZMIGRODZKI. Munich, 1890.

THE application of the facts drawn from ethnology and archaeology to the practical social questions of the day is one of the new and valuable acquisitions of science. Being new, one may reasonably expect that some time will elapse before it is employed with the best advantage; but meanwhile all honest and earnest efforts in this direction should be respectfully considered.

One such is before us in these works of the Polish writer Zmigrodzki. Appreciating that the position of woman in the social organization is the test of its excellence, he reviews the growth of the Aryan nations, both anthropologically and historically, and seeks to draw from his material the wisest rules for the place of woman in the present and the future of European and general civilization.

Without discussing the mass of learning on which he founds his conclusions, it is worth while stating what these are. He first urges that both sexes have naturally, and should be guaranteed legally, absolutely equal civil rights, equal opportunities for gaining an independent livelihood, equal wages, equal admission to all professions, avocations, and State employments. No marriage should be allowed until the woman is twenty and the man twenty-five years of age. The ceremony of marriage should be religious only, and the bond should be indissoluble, divorce for any ground being inadmissible. Illegitimate children should inherit equally with legitimate, and prostitutes should be condemned to forced labor for two years. During pregnancy, a woman who is earning salary or wages should have her income continued without labor on her part.

It is evident how impracticable and even grotesque are some of these recommendations; but, as they are founded on a supposed logical development of the theory of the equality of the sexes, they are interesting as illustrating the inherent difficulties in the way of this theory. There is also an evident desire on the part of the author to square his conclusions as much as possible with the precepts of the Roman Church, which obviously hampers his freedom.

His pamphlet on the Svastika is an endeavor to prove that this mysterious symbol is strictly Aryan in character, and is connected with the *Mutterrecht*. He seems to forget that his extreme devotion to the Aryan history and culture is often in rather ludicrous contrast to his obeisances to the Semites, Moses, Luke, Peter, etc., whom he frequently quotes, and whose religion he has adopted, as distilled through Roman alembics.

The American Race: A Linguistic Classification and Ethnographic Description of the Native Tribes of North and South America. By DANIEL G. BRINTON, A.M., M.D. New York, N. D. C. Hodges. 8°. \$2.

FOLLOWING close upon his "Races and Peoples," which appeared last year, the present volume is a further evidence, if such were needed, of Dr. Brinton's untiring devotion to linguistic and ethnographical studies. "The American Race" is the first attempt to classify systematically the peoples of the continent of America, who are its aborigines, upon a basis of language, — a basis of classification which would seem to be more safe and more useful in America than in any other quarter of the globe. In his use of language as a classifier of peoples, the author attaches

primary importance to grammatical construction, although he admits that our knowledge of the grammar of some American peoples is very meagre.

In his introductory remarks, Dr. Brinton reviews the general aspects of American anthropology, touching upon the various theories advanced regarding the peopling of the New World, the age of man in America, the glacial epoch, racial traits and characteristics, arts, religion, languages. His conclusions are that there is an "American race," and that primitive American man in all probability migrated by way of the North Atlantic land-bridge from the Eurafian continent.

He divides the American race into five great groups: I. The North Atlantic group; II. The North Pacific group; III. The Central group; IV. The South Pacific group; V. The South Atlantic group.

As regards "temperament, culture, and physical traits," Dr. Brinton considers that there is a "distinct resemblance" between the North Atlantic and the South Atlantic groups, and that there is "an equally distinct contrast" between these and the Pacific groups.

Of the main portion of the book, pp. 59-164 are occupied with the discussion of the peoples of North and Central America; pp. 165-332, with those of South America. The "Linguistic Appendix" (pp. 333-364) is invaluable, containing comparatives, vocabularies (of sixteen words and the numerals from one to five) in no fewer than one hundred and twenty languages and dialects of Mexico, Central and South America. Dr. Brinton's characteristic wealth of suggestion appears throughout the book, particularly in the portions which deal with the peoples of Central and South America, to whom special attention appears to have been given.

In the North Atlantic group are classed (1) the Eskimo, who formerly ranged much farther south, and whose primitive home was in the Hudson Bay region; (2) the isolated Beothuks of Newfoundland, who appear to have no marked affinities, as far as language is concerned, with any other people; (3) the wide-spread Athapascans, who are found over the wide territory from the Arctic Ocean to the frontiers of Mexico, and from Hudson Bay to the shores of the Pacific; (4) the Algonkins, who inhabited the North Atlantic littoral and the lake region of Canada; (5) the Iroquois, an inland people, with whom are affiliated in language the Cherokees; (6) the Chahta-Muskokis; (7) diverse tribes, such as the Catawbass, Yuches, Timucuas, etc., whom the author believes to be the remnants of the peoples who occupied the region before the immigration of the Muskokis from the North and West (it would appear, however, that to these Allophyllian tribes the Catawbass, at least, no longer belong, as they have distinct affinities with the Siouan stock); (8) Pawnees or Caddoes; (9) the important Dakotan or Siouan stock; (10) Kioways.

The North Pacific group comprises the tribes of the North-west coast and California, besides the Yumas and Pueblo peoples. There is room for much research within this group of tribes; and the recent investigations of careful observers like Dr. Boas have cleared up not a few troublesome questions in the ethnology of the Pacific region.

Under the Central group Dr. Brinton classes the Uto-Aztecan (comprising the Shoshonian, Sonorian, and Nahuatl); the various tribes of Mexico and Central America, such as the Otomis, Zapotecs, Chapanec, Chontals, Mayas, Lencas, Musquitos, etc.

Here for the first time we learn the affinities of some of the Central American languages; such as the Rama, for example.

The chapters of the book relating to South America are more detailed, and the reader will find in them an excellent guide with which to thread the mazes of South American tribal nomenclature.

The first great division of this half of the continent is the South Pacific group, which embraces (1) the tribes of the Columbian region, and (2) the tribes of the Peruvian region. The principal Columbian peoples are the Cunas, Changuinas, Choccos, and others of the Isthmus of Panama and the adjacent coast, the well-known Chibchas, the Paniquitas and Paezes (identified as one by Dr. Brinton), and the various tribes of the southern states of Cauca and Antioquia. In this region the author determines the Cayapa and Colorado to be dialects of the same stock.

The Peruvian sub-group comprises the Kéchuas and Aymaras, Puquinas, Yuncas, Atacameños, and Changos. The exact affiliation of these languages has not yet been made out. Dr. Brinton thinks that ultimately the Aymara will be shown to be either a dialect of Kechua, or a jargon made up of Kechua and other stocks.

The South Atlantic group is a very extensive one, including the innumerable tribes of the Amazonian and Pampean regions, who are spread over the territory from the Orinoco to Tierra del Fuego. The principal subdivisions of the Amazonian sub-group are the Tupis (with some forty dialects); the Tapuyas (with nearly as many); the Arawaks (more diverse even than the Tupis); the Caribs (with numerous dialects); the Corvados, Carajas, etc.; the Carib and Arawak tribes of the Orinoco basin; the numerous tribes of the basin of the Upper Amazon (Zaparos, Jivaros, etc.); and the Chiquitos, Mosatenas, Cayubabas, and other tribes of the Bolivian Highlands. The author attaches the Paiconoca and Saraveca to the Arawak stock, and thinks that Carajas have Tapuya affinities, while the Yahuas and Pebas appear to be somewhat related.

In the subdivision of the Pampean region Dr. Brinton has arranged the Guaycurus, Lules, Payaguas, and other peoples of the Grand Chaco; the Pampeans, Araucanians, and Chonos; the Patagonians and Fuegians. The modern Vilela the author is inclined to consider the present representative of the Lules of whom

Father Machoni wrote in 1732. The affinities of the coast tribes of Patagonia are uncertain. The relations of the Patagonians (Chonek) still remain to be settled. Among the Fuegians there appear to be at least three distinct linguistic stocks, — the Alikuluf, the Ona, and the Yahgan.

Taken on the whole, the present volume is beyond doubt the best introduction to American ethnology that we possess, and the reader will learn from it how much American linguistic and ethnographic science has advanced of recent years.

AMONG THE PUBLISHERS.

THE editor of the "Letters of Dorothy Osborne," Mr. Edward Abbott Parry, has written a life of Charles Macklin for Mr. William Archer's series of Eminent Actors, and Longmans, Green, & Co. published it here last week.

— "Miracles and Medicine" is the subject which Dr. Andrew D. White will take up next in his Warfare of Science Papers in *The Popular Science Monthly*. The May number will contain the first part of this chapter, telling how tales of miraculous cures arose and grew in the middle ages, and how the early progress of medical science was hampered by the jealousy of relic-peddlers and theological oracles. The Duke of Argyll's essay, "Professor Huxley on the War-Path," will be concluded in the same number. The duke appeals to geology for evidence of an inundation such

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